Ash Creek Associates, Inc.
Environmental and Geotechnical Consultants

February 22, 2012

Mr. Dwight Leisle
Port of Portland
7200 NE Airport Way
Portland, Oregon 97218

Re: Riverbank Soil Sampling Results — Operable Unit 3
Swan Island Upland Facility
Portland, Oregon
ECSI No. 271
1115-08

Dear Mr. Leisle:

This letter presents the results of riverbank soil sampling activities completed to support a no further action (NFA) request for Operable Unit 3 (the Facility or OU3) at the Swan Island Upland Facility (SIUF) in Portland, Oregon (Figures 1 and 2). The Port of Portland (Port) is under a Voluntary Cleanup Program (VCP) Agreement with the Oregon Department of Environmental Quality (DEQ) for Remedial Investigation (RI), Source Control Measures (SCMs), and Feasibility Study (FS) at the Facility (dated July 24, 2006). The DEQ approved the *Proposed Riverbank Sampling Work Plan* (dated November 8, 2011) in a letter dated November 9, 2011. The methods, procedures, and results of the chemical analyses are presented in this letter.

SAMPLING ACTIVITIES

Preparatory Activities

The following activities were completed in preparation for the field work.

- Health and Safety Plan (HASP). Ash Creek Associates (Ash Creek) prepared a HASP for its personnel involved with the project.

Riverbank Reconnaissance

On November 30, 2011, Ash Creek completed a visual reconnaissance of the OU3 riverbank. The entire length of the bank was observed and mapped using visual observations made from the berths and foot pier (due to the presence of heavy vegetation and the steepness of the riverbank slope). Additional observations were made on December 1, 2011 as part of the riverbank soil sampling completed via boat access. Figure 3 shows the results of the visual mapping, identifying observed geomorphic features. A photograph log is included in Attachment A.

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In general, the surface condition of the riverbank is characterized by dense vegetation above the approximate ordinary line of high water (OLHW – identified based on visual determination of the location where predominantly upland vegetation was present). Vegetation generally consists of grasses and shrubs. Below the OLHW, the bank generally consists of rip rap. Evidence of a historical wooden retaining wall was observed running the length of the Facility. Portions of the retaining wall have deteriorated, leading to some loss of the riverbank. The remainder of the retaining wall is bowing under the pressure of the riverbank material, which could lead to a potential failure.

Locally, various surface features (designated A through L) were observed and mapped. The observed features are identified on Figure 3 and discussed below.

- A – Oversteepened slope with exposed soil. No signs of active erosion observed.
- B – Oversteepened vegetated slope.
- C – Exposed soil defined by drip-line of overlying maple tree. No signs of active erosion observed.
- D – Exposed soil defined by drip-line of overlying maple tree. No signs of active erosion observed.
- E – Oversteepened slope with exposed soil. No signs of active erosion observed.
- F – Riverbank soil observed sloughing under wooden retaining wall.
- G – Oversteepened slope with exposed soil. No signs of active erosion observed.
- H – Vegetated erosion scarp (maximum height approximately 6 inches). This feature is located near the OLHW with a length of approximately 10 feet.
- I – Rafted debris near the OLHW.
- J – Vegetated erosion scarp (maximum height approximately 1 foot). This feature is located near the OLHW with a length of 20 feet.
- K – Erosion scarp (maximum height approximately 2 feet). This feature is located near the OLHW with a length of 25 feet on OU3 but continues onto OU1.
- L – Riverbank soil observed sloughing under wooden retaining wall.

In summary, the riverbank is characterized by dense vegetation with 12 observed surface features. Only three of these features consist of visible erosion scarps (H, J, and K). The erosion scarps are linear features running parallel to the riverbank. They are located at or above the transition from rip rap to vegetated riverbank. The observed characteristics of the erosion at K suggest the scarp is the result of downward movement of the riverbank due to deterioration of the wooden retaining wall. Features H and J are likely the result of wave action (caused primarily by vessel wakes). The majority of the riverbank is covered with rip rap or dense vegetation and has no evidence of erosion, demonstrating that rip rap and vegetation are effective.

Soil Sampling

Figure 3 shows the five soil sampling locations (OU3-RB-1 through OU3-RB-5; established based on observations of potentially erodible soil). Due to the presence of heavy vegetation and the steepness of the riverbank slope, the riverbank was accessed via a small boat. The samples were collected in accordance with Standard Operating Procedure (SOP) 2.2 (Attachment B). The samples were field screened for volatile organic compounds (VOCs) using a photoionization detector (PID) and for the presence of petroleum hydrocarbons using a sheen test in accordance with SOP 2.1. No field indications of VOCs or petroleum hydrocarbons were observed. The soil conditions where each sample was collected were described in the field notes. The sample locations were recorded using a high-accuracy, handheld global positioning system (GPS) device (Trimble© GeoXH™).

ANALYTICAL RESULTS

The soil samples collected from the above activities were submitted to Pace Analytical Services, Inc. in Seattle, Washington for chemical analysis. Copies of the laboratory reports are included in Attachment C (in CD-Rom format due to the length of the Level III deliverable report). The samples were analyzed on a standard turnaround time (up to 10 business days). A quality assurance review of the data was completed. No qualifiers were attached to the data as a result of our review.

The soil samples were analyzed for the following (Table 1).

- Polychlorinated biphenyls (PCBs) by EPA Method 8082 (Aroclors 1016, 1221, 1232, 1242, 1248, 1254, 1260, 1262, and 1268).
- Priority pollutant 13 metals by EPA 6000/7000 Series Methods;
- Polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270-SIM; and
- Butyl tins by the Krones Method.

The sample results were screened against the Portland Harbor Joint Source Control Strategy (JSCS) Screening Level Values (SLVs) for Soil/Storm Water Sediment.

- Metals. Lead was detected at concentrations above the JSCS SLV in samples OU3-RB-2 through OU3-RB-5. Mercury was detected at a concentration above the JSCS SLV in sample OU3-RB-5. The metals enrichment ratios (ER; concentration divided by SLV) ranged from 1.4 to 5.2.
- PAHs. Benzo(g,h,i)perylene, and indeno(1,2,3-cd)pyrene were detected above the JSCS SLVs in sample OU3-RB-5. The ERs were 1.1 and 2.7, respectively.
- PCBs. The total PCB concentrations of in samples OU3-RB-3 and OU3-RB-5 exceeded the JSCS bioaccumulation SLV (0.39 µg/kg) at ERs of 51 and 63, respectively.
- Butyl Tins. Tributyltin (TBT) was detected in sample OU3-RB-5 at a concentration above the JSCS SLV with an ER of 11.

FINDINGS AND CONCLUSIONS

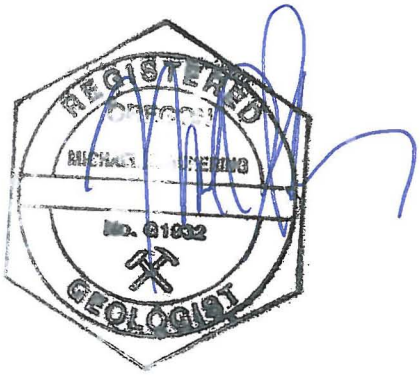
Riverbank soil samples were collected to assess the potential for contaminant transport to the Swan Island Lagoon. Portions of the historical retaining wall have deteriorated, leading to some loss of the riverbank. The remainder of the retaining wall is bowing under the pressure of the riverbank material, which could lead to a potential failure. Minor erosion scarps and areas of exposed soil were identified during the riverbank reconnaissance activities. Based on the data evaluation and consideration of other lines of evidence, the potential contaminant migration pathways to the Swan Island Lagoon at OU3 are incomplete or not of concern per the following.

- No current sources of contaminants to the riverbank;
- Presence of surface erosion controls (rip rap, vegetation);
- SLV exceedances were limited and relatively low even for bioaccumulation SLVs for total PCBs and TBT; and
- The storm water pathway was previously assessed and no additional work was requested by the DEQ.

No source control measures are recommended for OU3. The overall trend in contaminant concentrations generally increased in the direction of OU1. Subsequent soil sampling of the OU1 riverbank is recommended.

If you have any questions regarding these activities, please contact the undersigned at (503) 924-4704 x106.

Sincerely,



Michael J. Pickering, R.G.
Senior Associate Hydrogeologist

ATTACHMENTS

Table 1 – Riverbank Soil Analytical Results

Figure 1 – Facility Location Map
Figure 2 – Facility Vicinity Map
Figure 3 – Sampling Plan

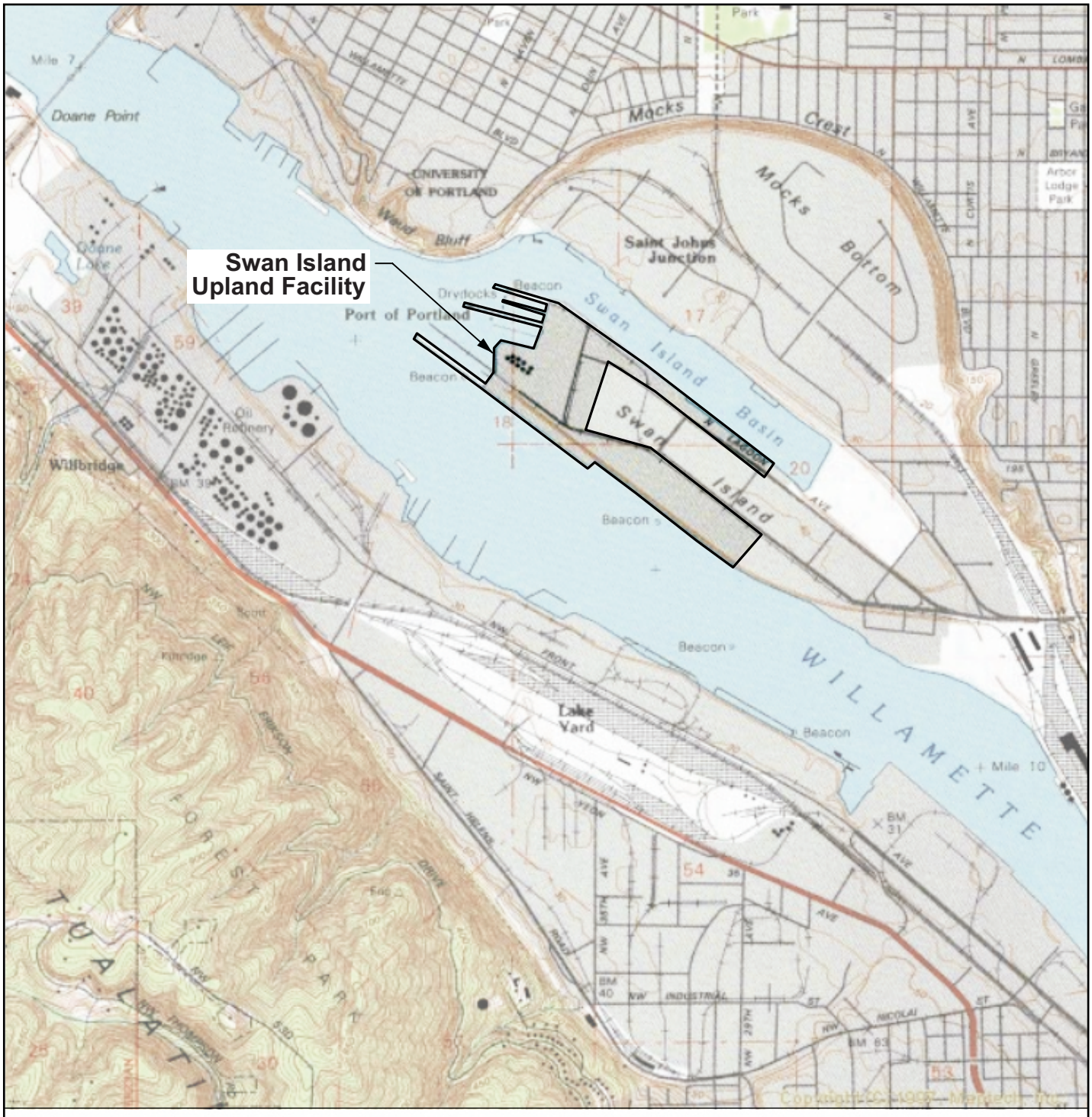
Attachment A – Photograph Log
Attachment B – Standard Operating Procedures 2.1 and 2.2
Attachment C – Laboratory Analytical Report (CD-Rom)

Table 1 - Riverbank Soil Analytical Results
SIUF - OU3
Portland, Oregon

Sample ID:	OU3-RB-1	OU3-RB-2	OU3-RB-3	OU3-RB-4	OU3-RB-5	JSCS
Sample Date:	12/1/2011	12/1/2011	12/1/2011	12/1/2011	12/1/2011	SLV
Metals by EPA 6000/7000 Series (mg/kg)						
Antimony	0.17 J	0.13 J	0.38 J	0.26 J	<0.49	64
Arsenic	2.2	7.0	2.4	2.3	3.3	7
Beryllium	0.44	0.66	0.36	0.43	<0.49	--
Cadmium	0.130	0.16	0.20	0.12	0.41	1
Chromium	12.8	22.3	14.5	14.0	26.0	111
Copper	23.4	31.6	26.0	31.3	35.1	149
Lead	15.2	31.3	50.4	24.6	88.1	17
Mercury	0.014 J	0.026 J	0.072 J	0.063 J	0.15	0.07
Nickel	15.8	21.5	14.3	13.7	18.1	48.6
Selenium	0.85	0.96	0.72	0.80	<1.2	5
Silver	2.8	0.57	0.24 J	0.30 J	<0.39	5
Thallium	0.10	0.14	0.15	0.12	<0.25	--
Zinc	76.1	100	130	84.0	120	459
Polycyclic Aromatic Hydrocarbons by EPA Method 8270M-SIM (µg/kg)						
Acenaphthene	<1.3	<1.5	<1.4	<1.5	<15.3	300
Acenaphthylene	<1.3	3.6 J	5.5 J	4.6 J	59.2 J	200
Anthracene	<1.3	5.1 J	9.8	7.6 J	67.2 J	845
Benz(a)anthracene	2.4 J	14.7	21.3	13.8	184	1,050
Benzo(a)pyrene	3.2 J	18.6	21.7	19.6	289	1,450
Benzo(b)fluoranthene	5.5 J	29.9	39.0	37.5	359	--
Benzo(g,h,i)perylene	4.4J	19.5	33.4	25.5	321	300
Benzo(k)fluoranthene	<1.2	8.1 J	14.6	9.1	94.4	13,000
Chrysene	4.1 J	30.3	40.2	43.8	255	1,290
Dibenz(a,h)anthracene	0.97 J	3.7 J	6.4 J	5.7 J	34.8 J	1,300
Fluoranthene	5.0 J	51.2	47.1	21.7	445	2,230
Fluorene	<1.6	<1.8	1.8 J	<1.8	<18.3	536
Indeno(1,2,3-cd)pyrene	2.7 J	15.2	19.9	16.6	273	100
1-Methylnaphthalene	<1.4	<1.6	<1.4	<1.6	<15.7	--
2-Methylnaphthalene	1.6 J	1.8 J	2.3 J	2.5 J	<15.7	200
Naphthalene	<3.0	4.7 J	3.5 J	<3.4	<34.5	561
Phenanthrene	2.5 J	26.9	22.1	13.0	248	1,170
Pyrene	5.1 J	52.2	41.9	25.7	600	1,520
Polychlorinated Biphenyls by EPA Method 8082 (µg/kg)						
Aroclor 1016	<5.5	<6.2	<5.6	<6.3	<6.3	530
Aroclor 1221	<2.8	<3.1	<2.8	<3.2	<3.2	--
Aroclor 1232	<3.9	<4.3	<3.9	<4.4	<4.4	--
Aroclor 1242	<5.1	<5.7	<5.1	<5.8	<5.8	--
Aroclor 1248	<4.9	<5.5	<4.9	<5.6	<5.6	1,500
Aroclor 1254	<3.0	<3.3	<3.0	<3.4	<3.4	300
Aroclor 1260	<5.9	<6.6	19.9	<6.8	24.7	200
Aroclor 1262	<3.5	<3.9	<3.5	<4.0	<3.9	--
Aroclor 1268	<1.6	<1.8	<1.6	<1.8	<1.8	--
Total PCBs	<5.9	<6.6	19.9	<6.8	24.7	0.39
Butyl Tins by Krones Method (µg/kg)						
Tributyltin Ion	<3.6	<3.6	<3.7	<3.6	25	2.3
Dibutyltin Ion	<5.4	<5.3	<5.6	<5.4	8.6	--
Butyltin Ion	<3.8	<3.8	<3.9	2.6 J	6.0	--
Tetrabutyltin Ion	<4.7	<4.6	<4.8	<4.7	<4.6	--

Notes:

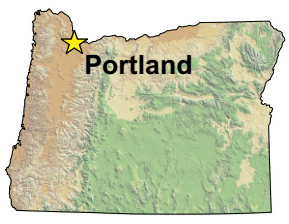
1. µg/kg (ppb) = micrograms per kilogram (parts per billion)
2. mg/kg = Milligrams per kilogram (parts per million).
3. JSCS SLV = Portland Harbor Joint Source Control Strategy Table 3-1: Screening Level Values for Soil/Storm Water Sediment (7/16/07 Revision).
4. Shading indicates that the reported concentration exceeds the screening level.
5. -- = Not available.



Note: Base map prepared from USGS 7.5-minute quadrangles as provided by Topozone. (1990)

0 2,000 4,000

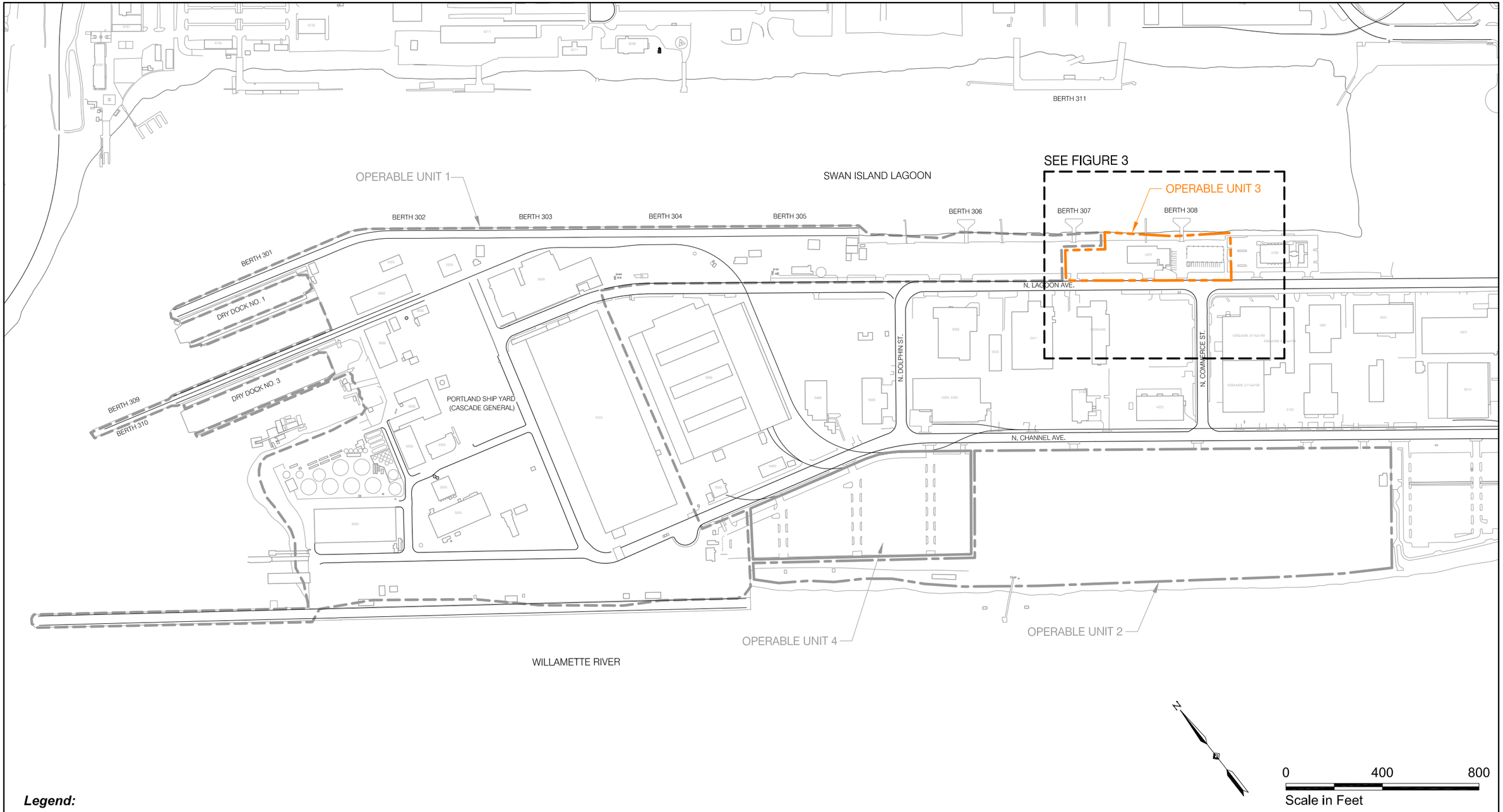
Approximate Scale in Feet



Facility Location Map

Riverbank Soil Sampling Results
Swan Island Upland Facility, Operable Unit 3
Portland, Oregon

Ash Creek Associates, Inc. Environmental and Geotechnical Consultants	Project Number 1115-08	Figure 1
	January 2012	



Legend:

- Operable Unit 1 Boundary
- Operable Unit 2 Boundary
- Operable Unit 3 Boundary
- Operable Unit 4 Boundary

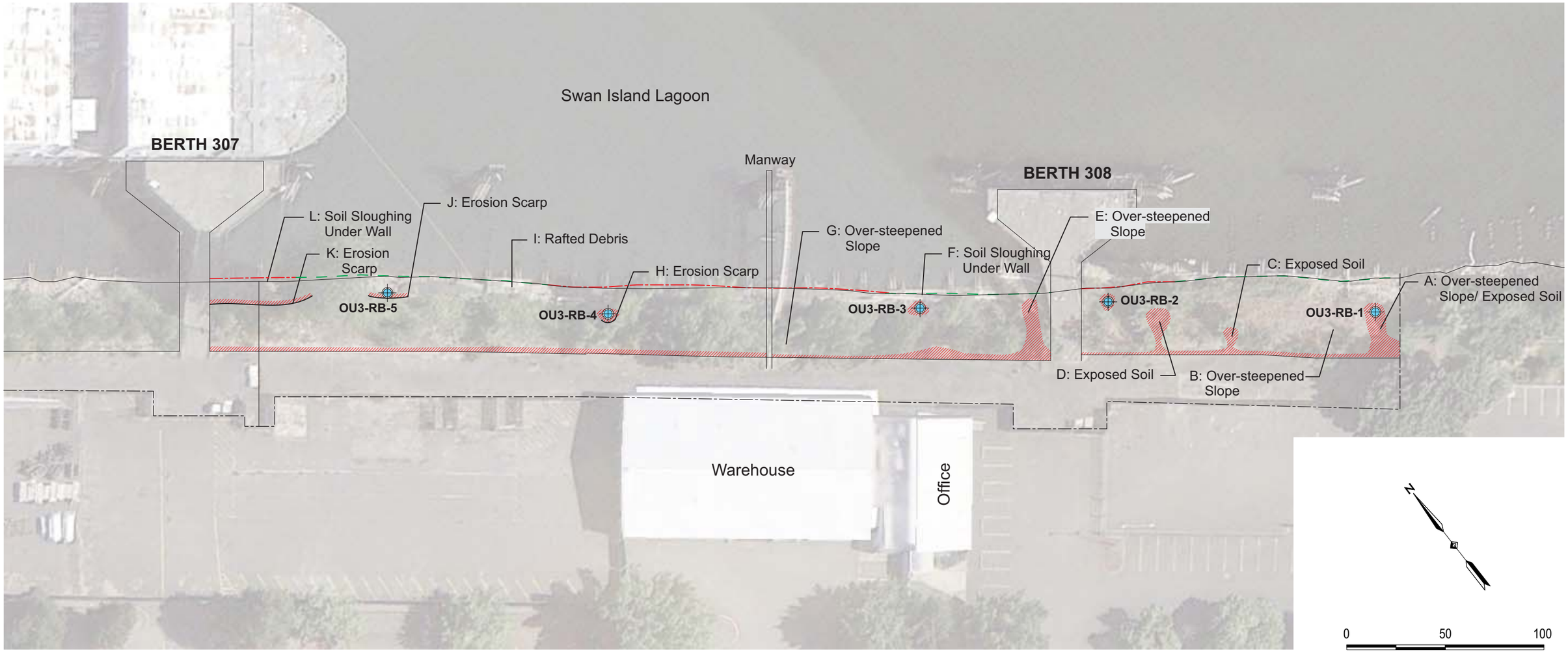
NOTE:
1. Prepared from AutoCAD base map received from the Port of Portland in June 2007.

Site Vicinity Map

Riverbank Soil Sampling Results
Swan Island Upland Facility, Operable Unit 3
Portland, Oregon

Ash Creek Associates, Inc.
Environmental and Geotechnical Consultants

Project Number	1115-08	Figure
January 2012		2



Legend:

OU3-RB-4 Surface Soil Location

Exposed Soil

Wooden Retaining Wall - In Place

Wooden Retaining Wall - Missing or Failing

Sampling Plan

Riverbank Soil Sampling Results
Swan Island Upland Facility, Operable Unit 3
Portland, Oregon

Ash Creek Associates, Inc.
Environmental and Geotechnical Consultants

Project Number	1115-08	Figure
January 2012		3

Attachment A

Photograph Log

Attachment A
PHOTOGRAPH LOG

Project Name: Swan Island Upland Facility, OU3
Project Number: 1115-08

Client: Port of Portland
Location: Portland, Oregon

Photo No: 1	
Photo Date: 10/10/2011	
Orientation: Southwest	
Description: <u>Feature A</u> Over-steepened cut in river bank, at southeast corner of riverbank (left of the storm water outfall).	

Photo No: 2	
Photo Date: 11/30/2011	
Orientation: Southwest	
Description: <u>Feature A</u> Sample location OU3-RB-1 (in white circle).	

Attachment A
PHOTOGRAPH LOG

Project Name: Swan Island Upland Facility, OU3
Project Number: 1115-08

Client: Port of Portland
Location: Portland, Oregon

Photo No: 3	
Photo Date: 11/30/2011	
Orientation: Southeast	
Description: <u>Feature B</u> Over-steepened slope as seen from Berth 308.	

Photo No: 4	
Photo Date: 11/30/2011	
Orientation: Southwest	
Description: <u>Feature D</u> Exposed soil under drip line of Maple tree on riverbank, covered by leaf litter.	

Attachment A
PHOTOGRAPH LOG

Project Name: Swan Island Upland Facility, OU3
Project Number: 1115-08

Client: Port of Portland
Location: Portland, Oregon

Photo No: 5	
Photo Date: 11/30/2011	
Orientation: Southwest	
Description: <u>Feature D</u> Sample location OU3-RB-2 (in white circle). Exposed soil at this location is the result of thin rip-rap cover.	

Photo No: 6	
Photo Date: 11/30/2011	
Orientation: Northeast	
Description: <u>Feature E</u> Over-steepened slope with exposed soil west of Berth 308.	

Attachment A
PHOTOGRAPH LOG

Project Name: Swan Island Upland Facility, OU3
Project Number: 1115-08

Client: Port of Portland
Location: Portland, Oregon

Photo No: 7	
Photo Date: 11/30/2011	
Orientation: Southwest	
Description: Feature E Over-steepened slope with exposed soil west of Berth 308.	

Photo No: 8	
Photo Date: 12/01/2011	
Orientation: West	
Description: Feature F Rip-rap sloughing under historical wooden wall section.	

Attachment A
PHOTOGRAPH LOG

Project Name: Swan Island Upland Facility, OU3
Project Number: 1115-08

Client: Port of Portland
Location: Portland, Oregon

Photo No: 9	
Photo Date: 11/30/2011	
Orientation: Southeast	
Description: Feature F Sample location OU3-RB-3 (in white circle).	

Photo No: 10	
Photo Date: 11/30/2011	
Orientation: Southwest	
Description: Feature G Over-steepened slope with dense vegetation west of manway.	

Attachment A
PHOTOGRAPH LOG

Project Name: Swan Island Upland Facility, OU3
Project Number: 1115-08

Client: Port of Portland
Location: Portland, Oregon

Photo No: 11	
Photo Date: 12/01/2011	
Orientation: South	
Description: Feature H Sample location OU3-RB-4 (in white circle).	

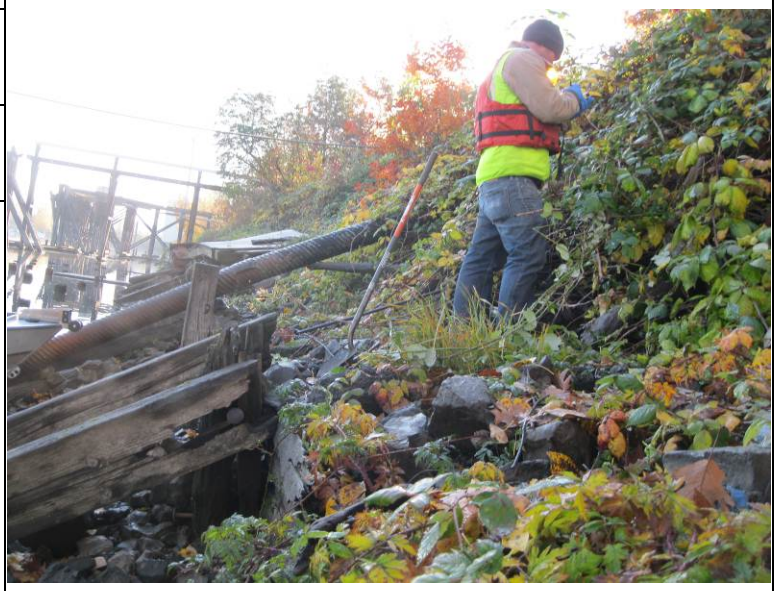
Photo No: 12	
Photo Date: 12/01/2011	
Orientation: Southwest	
Description: Feature H Vegetated erosion scarp with height (approximately 6 inches) emphasized by white bracket.	

Attachment A
PHOTOGRAPH LOG

Project Name: Swan Island Upland Facility, OU3
Project Number: 1115-08

Client: Port of Portland
Location: Portland, Oregon

Photo No: 13	
Photo Date: 10/10/2011	
Orientation: West	
Description: Feature I Rafted debris near the ordinary line of high water (OLHW).	

Photo No: 14	
Photo Date: 12/01/2011	
Orientation: Southeast	
Description: Feature J Vegetated erosion scarp on right of photograph (under thick vegetation). Sample location OU3-RB-5.	

Attachment A
PHOTOGRAPH LOG

Project Name: Swan Island Upland Facility, OU3
Project Number: 1115-08

Client: Port of Portland
Location: Portland, Oregon

Photo No: 15	
Photo Date: 12/01/2011	
Orientation: Southeast	
Description: Feature J Sample location OU3-RB-5 (adjacent to sampling bowl).	

Photo No: 16	
Photo Date: 11/30/2011	
Orientation: Southeast	
Description: Feature K Erosion scarp at top of rip-rap. The boundary between Operable Unit 3 (OU3) and OU1 is approximated by the rope in the center of the photograph.	

Attachment A
PHOTOGRAPH LOG

Project Name: Swan Island Upland Facility, OU3
Project Number: 1115-08

Client: Port of Portland
Location: Portland, Oregon

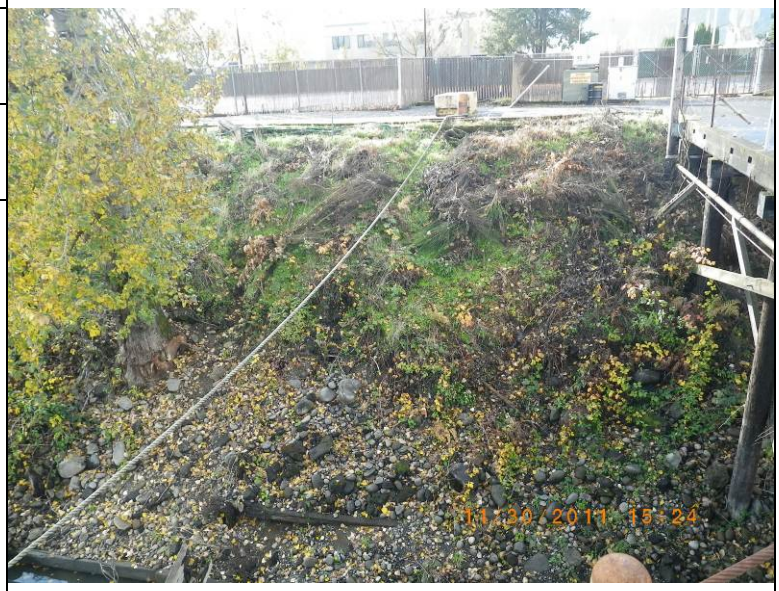
Photo No: 17	
Photo Date: 11/30/2011	
Orientation: South	
Description: Feature K Erosion scarp at top of rip-rap. The boundary between OU3 and OU1 is approximated by the rope in the center of the photograph.	

Photo No: 18	
Photo Date: 11/30/2011	
Orientation: Southeast	
Description: Feature L Rip-rap sloughing under historical wooden wall section.	

Attachment B

Standard Operating Procedures 2.1 and 2.2

1. PURPOSE AND SCOPE

This Standard Operating Procedure (SOP) provides instructions for standard field screening. Field screening results are used to aid in the selection of soil samples for chemical analysis. This procedure is applicable during all Ash Creek Associates (ACA) soil sampling operations.

Standard field screening techniques include the use of a photoionization detector (PID) to assess for volatile organic compounds (VOCs), for the presence of separate-phase petroleum hydrocarbons using a sheen test. These methods will not detect all potential contaminants, so selection of screening techniques shall be based on an understanding of the site history. The PID is not compound or concentration-specific, but it can provide a qualitative indication of the presence of VOCs. PID measurements are affected by other field parameters such as temperature and soil moisture. Other field screening methods, such as screening for dense non-aqueous phase liquid (DNAPL) using dye or UV light, are not considered "standard" and will be detailed in the site-specific sampling and analysis plan (SAP).

2. EQUIPMENT AND MATERIALS

The following materials are necessary for this procedure:

- PID with calibration gas (record daily calibration/calibration check in field notes);
- Plastic resealable bags (for PID measurement); and
- Glass jars or stainless steel bowls (for sheen testing).

3. METHODOLOGY

Each soil sample will be field screened for VOCs using a PID and for the presence of separate-phase petroleum hydrocarbons using a sheen test. If the presence of DNAPL is suspected, then screening using dye and UV light may also to be completed. For information regarding screening using dye or UV light, refer to the site specific sampling and analysis plan.

PID lamps come in multiple sizes, typically 9.8, 10.6, and 11.7 electron volts (eV). The eV rating for the lamp must be greater than the ionization potential (in eV) of a compound in order for the PID to detect the compound. For petroleum hydrocarbons, a lamp of at least 9.8 eV should be used. For typical chlorinated alkenes (dichloroethene, trichloroethene, tetrachloroethene, or vinyl chloride.), a lamp of at least 10.6 eV should be used. The compatibility of the lamp size with the site constituents should be verified prior to the field event and will be detailed in the site-specific SAP.

PID Calibration Procedure: The PID used on-site should be calibrated daily or more frequently if needed. Calibration of the PID should be documented in field notes. Calibrations procedures should be conducted according to the manufacturer's instructions. .

<u>PID Screening Procedure:</u>

- Place a representative portion (approximately one ounce) of freshly exposed, uncompacted soil into a clean resealable plastic bag.
- Seal the bag and break up the soil to expose vapors from the soil matrix.
- Allow the bag to sit to reach ambient temperature. Note: Ambient temperature and weather conditions/humidity should be recorded in field notes. Changes in ambient temperature and weather during the field work should also be recorded, as temperature and humidity can affect PID readings.
- Carefully insert the intake port of the PID into the plastic bag.
- Record the PID measurement in the field notes or boring logs.

<u>Sheen Test Procedure:</u>

- Following the PID screen, place approximately one ounce of freshly exposed, uncompacted soil into a clean glass jar or stainless steel bowl.

- Add enough water to cover the sample.
- Observe the water surface for signs of discoloration/sheen and characterize

No Sheen (NS)	No visible sheen on the water surface
Biogenic Film (BF)	Dull, platy/blocky or foamy film.
Slight Sheen (SS)	Light sheen with irregular spread, not rapid. May have small spots of color/iridescence. Majority of water surface not covered by sheen.
Moderate Sheen (MS)	Medium to heavy coverage, some color/iridescence, spread is irregular to flowing. Sheen covering a large portion of water surface.
Heavy Sheen (HS)	Heavy sheen coverage with color/iridescence, spread is rapid, entire water surface covered with sheen. Separate-phase hydrocarbons may be evident during sheen test.

1. PURPOSE AND SCOPE

This Standard Operating Procedure (SOP) describes the methods used for obtaining surface soil samples for physical and/or chemical analysis. For purposes of this SOP, surface soil (including shallow subsurface soil) is loosely defined as soil that is present within 3 feet of the ground surface at the time of sampling. Various types of sampling equipment are used to collect surface soil samples including spoons, scoops, trowels, shovels, and hand augers.

2. EQUIPMENT AND MATERIALS

The following materials are necessary for this procedure:

- Spoons, scoops, trowels, shovels, and/or hand augers. Stainless steel is preferred.
- Stainless steel bowls
- Laboratory-supplied sample containers
- Field documentation materials
- Decontamination materials
- Personal protective equipment (as required by Health and Safety Plan)

3. METHODOLOGY

Project-specific requirements will generally dictate the preferred type of sampling equipment used at a particular site. The following parameters should be considered: sampling depth, soil density, soil moisture, use of analyses (e.g., chemical versus physical testing), type of analyses (e.g., volatile versus non-volatile). Analytical testing requirements will indicate sample volume requirements that also will influence the selection of the appropriate type of sampling tool. The project sampling plan should define the specific requirements for collection of surface soil samples at a particular site.

Collection of Samples

- Volatile Analyses. Surface soil sampling for volatile organics analysis (VOA) is different than other routine physical or chemical testing because of the potential loss of volatiles during sampling. To limit volatile loss, the soil sample must be obtained as quickly and as directly as possible. If a VOA sample is to collected as part of a multiple analyte sample, the VOA sample portion will be obtained first. The VOA sample should be obtained from a discrete portion of the entire collected sample and should not be composited or homogenized. Sample bottles should be filled to capacity, with no headspace. Specific procedures for collecting VOA samples using the EPA Method 5035 are discussed in SOP 2-7.
- Other Analyses. Once the targeted sample interval has been collected, the soil sample will be thoroughly homogenized in a stainless steel bowl prior to bottling. Sample homogenizing is accomplished by manually mixing the entire soil sample in the stainless steel bowl with the sampling tool or with a clean teaspoon or spatula until a uniform mixture is achieved. If packing of the samples into the bottles is necessary, a clean stainless steel teaspoon or spatula may be used.

General Sampling Procedure:

- Decontaminate sampling equipment in accordance with the Sampling and Analysis Plan (SAP) before and after each individual soil sample.
- Remove surface debris that blocks access to the actual soil surface or loosen dense surface soils, such as those encountered in heavy traffic areas. If sampling equipment is used to remove surface debris,

the equipment should be decontaminated prior to sampling to reduce the potential for sample interferences.

- When using a hand auger, push and rotate downward until the auger becomes filled with soil. Usually a 6- to 12-inch long core of soil is obtained each time the auger is inserted. Once filled, remove the auger from the ground and empty into a stainless steel bowl. If a VOA sample is required, the sample should be taken directly from the auger using a teaspoon or spatula and/or directly filling the sample container from the auger. Repeat the augering process until the desired sample interval has been augered and placed into the stainless steel bowl.

Backfilling Sample Locations:

Backfill in accordance with federal and state regulations including OAR 690-240 (e.g., bentonite requirements). The soils from the excavation will be used as backfill unless project-specific or state requirements include the use of clean backfill material.

Attachment C

Laboratory Analytical Report (CD-Rom)